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FOR RELEASE: UPON DELIVERY

RELEASE NO. 62-74

Remarks by
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National Aeronautics and Space Administration
at the
State Department Foreign Policy Briefing Conference
Washington, D.C.
March 27, 1962

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As a matter of background to the national space effort, all of you know that in the first 60 years of the Twentieth Century there have been major revolutions in many aspects of world affairs. We have seen empires fall, the old system of colonialism go, and many nations arise and move in the uncertain way of newborn organisms in the complex areas of international relations.

In this same period, we have seen major political upheavals -- the Russian and the Chinese revolutions.

We have also seen the all-encompassing scientific revolution at work in the world producing changes spreading across the entire range of man's problems. During this time, the United States has both moved of its own accord and been forced from a detached philosophy into a position of international leadership from which we increasingly see that the play of such forces vitally affects our future.

No longer are we isolated from world forces. We cannot be.

In World War II, we found that the enormously powerful tools of research and technology, teamed with our military efforts and organized in large-scale enterprises such as the Manhattan District atomic energy project made the difference between success and failure, and speeded up nuclear utilization at a fantastic rate. Following the war, we had a great national debate about how the force of atomic energy, one of the powers of science, would be employed in our democratic country.

Congress passed an Act which placed atomic energy development under a civilian agency. This Act supplemented the arrangements to meet our military requirements in a very unusual way, specifying that efforts which would not violate security, would be applied through the Commission for the general welfare.

This basic idea of organized science and technology grew and by 1950 the National Science Foundation had been established and had moved steadily forward toward strengthening and making more effective these major tools of progress for our democratic society.

Similarly, in 1958, the United States reached the climax of an extended debate about how to apply the capacity that the rocket gives us to go beyond the earth's atmosphere and outward for great distances into the expanse of the universe. The question was how this capacity could best be utilized to add to the knowledge of physics, astronomy, and all the other sciences, and also be utilized for early practical benefits.

A major change in outlook was involved. Technology was required to create tools for research -- technology of the highest level. We are constantly trying to achieve rocket vehicles whose structure and mechanical components will make up only five percent of the weight, allowing 95 percent for the fuel. That has not quite been achieved yet and is a radical departure from aircraft design. It requires the most advanced technology in the use of energy, of new lightweight materials, and of miniaturized electronics.

Prior to 1958, as rockets began opening up the vast reaches of space, people in all the sciences became interested in what the implications would be for their particular areas. Initially, their interest was expressed in the work of the International Geophysical Year in which scientists of many nations participated in the use of rockets for sending instruments out beyond the earth's atmosphere to conduct basic studies of the earth and its environment.

The IGY was a dramatic indication of the new knowledge that could be obtained through the use of rockets. In 1958, Congress passed the Space Act. The legislation set up an agency quite different from the Atomic Energy Commission or the old National Advisory Committee for Aeronautics. The National Aeronautics and Space Administration was designed to continue NACA's role of research in aeronautics, but was to expand its space work and become in that field an operating as well as a research organization.

Since you are interested in foreign policy, I would like to point out one significant factor. NASA is a relatively unclassified agency. There is a special requirement in the law that we carry out a broad program of public information. The National Aeronautics and Space Act of 1958 requires that NASA "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

The Act requires also that NASA work with the nationals of other countries in cooperative endeavors to the fullest extent possible, to develop science and technology in areas promising early, direct applications -- such as communications satellites, navigation satellites, meteorological satellites, as well as the technology growing out of this giant effort. Referring again to your interest in foreign policy, a few years later, in 1961, another great debate resulted in the creation of an agency capable of using science and technology for arms control and disarmament. The legislation establishing the Arms Control and Disarmament Agency was closely modeled on the National Aeronautics and Space Act.

Thus, the developments of the last 21 or 22 years -- beginning with the organized large-scale efforts in the war and continuing into the postwar triumphs of our science and technology -- were crystallized into national policy and programs through our democratic process of Presidential

proposals and budgetary decisions, of debate, of public understanding, and of votes in the Congress. All of it is based on a national investment of manpower, brain power, and resources to develop and exploit knowledge and technology at the most rapid rate possible and to utilize it in ways important to the Nation. It is based on a continuation of large-scale organized effort with basic research as the essential underlying ingredient. It involves our universities in very important ways, and it involves development of means through which the resources of these universities can be utilized without diluting or weakening the basic educational function of the university as a continuing institution in our society. This means graduate and postgraduate education must be closely linked with research.

We carry through as much of our program as possible by means of contracts with industry. It may interest you to note that an extremely large percentage -- some 90 or 92 percent -- of the funds the President is recommending for Fiscal Year 1963 will be spent in contracts with industry and other private organizations. The President's total recommendation is $3,787,000,000 for the National Aeronautics and Space Administration and something over $5,000,000,000 for the combined military, NASA, Atomic Energy, Weather Bureau, and National Science Foundation programs in space. For these programs, two ideas go hand-in-hand -- that the Government must make sure that the effort is organized and carried out but that the resources and facilities are not created within the governmental structure.

What circumstances brought the President to make such a large recommendation in the 1963 Budget?

Under the 1958 Space Act, several groups of scientists and engineers were brought together in NASA. First were those from the National Advisory Committee for Aeronautics which, over four decades, had rendered invaluable service to the Nation. Many of you may not realize that every plane serving in World War II gained added speeds of from 15 to 30 miles per hour thanks to one NACA research tool -- the full-scale wind tunnel. Nor is it well known that World War II submarines owed some of their greatly improved configurations to full-scale wind tunnel tests.

Thus, since 1958, a key element has been the adaptation to space problems of the kind of organization that developed

advanced technology for airplanes, comprised of men who had the philosophy, the experience, skill, and dedication for the work. Added to NACA personnel were such outstanding groups as that built up by the Army at Huntsville (the von Braun group), the staff of the Jet Propulsion Laboratory in California, and people from the Naval Research Laboratory and other activities associated with early missile and space projects.

The resulting NASA organization began in 1958 with a budget of something less than $400,000,000 a year. The budget was $523,000,000 in NASA's first full year, was increased to $964,000,000 the second year,and was expanded by the Eisenhower Administration to slightly more than a billion dollars in the budget for 1962. To follow this program of build-up would, by reasonable estimate, have cost about $23 to $25 billion over a period of 10 years. It would have provided for manned flight to the moon some time after 1970, perhaps in 1975.

Now let us examine the present situation. President Kennedy made a thorough study of the goals, problems, and requirements for U.S. leadership in space. While this was under way, in the first half of 1961, many dramatic space events occurred rapidly, including the two Russian manned orbital flights. During that period, the Vice President and the Space Council thoroughly surveyed the U.S. space program, including careful consideration of military missions in space. There was a determination that we could not afford to risk a second-best position and that we should proceed to build the large boosters necessary to lift heavy loads. A new program was worked out in which we were to spend approximately $35 billion in the next 10 years, or some $10 to $12 billion more than had been contemplated under the previous plan that extended over 15 years. The new plan would achieve a lunar landing within the present decade, rather than project it into the period after 1970. It was determined that the U.S. must have a program that would overtake the lead of the Russians in big boosters and accomplish along the way missions in which the world could see benefits for all men -- a program that would give the Russians serious competition in the most important undertaking for the decade, manned lunar exploration.

The NASA program for Fiscal Year 1963 carries with it the President's determination to mature the efforts begun

under the Eisenhower Administration, expedited under the first Budget prepared by President Kennedy, and now gaining rapid headway.

It may interest you to know that while NASA will be nearly doubling its budget annually, the staff of the Agency is not being expanded in proportion. Over a three-year period we are increasing our personnel from roughly 17,000 people now to about 26,000 -- indicating how much work we are contracting to private organizations.

Now, briefly, what is in the accelerated national effort?

First, we have a very active flight program using large rocket vehicles to enable man to move through the atmosphere and on out into space, to learn what we need to know about space itself and the return from space into the earth's atmosphere, and to gather information about the earth-sun phenomena which are so important in understanding the physical laws which govern life on earth.

In advance of manned flights outward from the earth, we are actively studying the space environment through use of a large number of sounding rocket flights. In addition, since 1958, the United States has successfully launched almost 70 major scientific satellites and deep space probes.

As a next step, we are proceeding with the maturing program for developing still larger multi-purpose vehicles for utilization in our space sciences program. There will be such large spacecraft as the Orbiting Astronomical Observatory, the Orbiting Solar Observatory, and the Orbiting Geophysical Observatory. These new types of space vehicles will draw power from the sun by means of solar cells and will store the energy. They will have telemetering equipment to handle a large number of experiments and transmit the data back to earth. They will be so versatile that on each launching they can carry into space entirely different sets of experiments, when this is desirable.

In the field of applications, last year we began developing three major communications satellite concepts -- two designed for low orbits and one for high-altitude synchronous

orbits. The first is Project Relay, financed by the Government, and the second is Project Telstar, completely financed by the American Telephone and Telegraph Company. The Syncom, or synchronous-orbit satellite, is financed by the Government and keys closely into military needs in connection with the Advent program, which is also a high-altitude synchronous satellite.

We will be working with the Navy also in connection with civilian utilization of the Transit satellite which has demonstrated that it has great value to our military services for navigation and which many believe will have wide commercial applications.

Now I would like to turn more specifically to our program of manned space flight. You know that on February 20 we reached the initial goal of the Mercury program with the flight of John Glenn three times around the earth. Project Mercury has been of great significance to this Nation's world stature. It has been equally important in encouraging our young people to develop their potential in mathematics and in science and technology generally.

John Glenn's flight was just a beginning of our manned exploration of space. We must conduct repeated flights, to obtain the data scientists and engineers need to plan and conduct future programs.

There will be further three-orbit flights in Project Mercury this year, at intervals of 60 to 90 days. Then late in the year or early next year, we will begin flights with a Mercury spacecraft modified so that it has the capability of remaining in orbit up to 24 hours.

To follow Mercury, we are developing the two-man spacecraft Gemini (named for the twin constellation Castor and Pollux). Gemini's flight program will be very much like that for the X-15. It will give us extensive experience in multi-manned space flight and will prove experimentally the things we need to know before we move into heavy expenditures for Project Apollo and the Advanced Saturn.

The Advanced Saturn is a very large rocket -- a launch vehicle with a cluster of five engines, each of which will

deliver a thrust of a million and one-half pounds. The first stage will generate approximately five times the power of Saturn which was test flown late last year and is still the largest known object that man has sent into space to date.

The Advanced Saturn will boost the three-man Apollo spacecraft. Apollo will be capable of orbiting the earth, of making a fly-by of the moon to investigate the moon's surface, radiation, and other of its phenomena -- and then returning into the earth's atmosphere at some 25,000 miles an hour.

But even this giant Advanced Saturn will not have enough weight-carrying power to land Apollo on the moon and return it to earth. Therefore, we have an option. We can either join the payloads of two Saturns in orbit around the earth and thus build in space the spaceship to go to the moon, or we can construct a still larger launch vehicle -- the Nova, which would require roughly twelve million pounds of thrust in the first stage. Nova would be powerful enough to carry some 150,000 pounds of payload to the moon by direct ascent from the earth's surface.

Obviously,it will be a gigantic task to carry all these steps through, and all of it will be expensive. If it does prove possible to join two Advanced Saturn payloads in orbit around the earth -- a technique called "rendezvous" -- we can save about two years and a large amount of money. We shall develop and test this advanced experimental program with the two-man Gemini spacecraft to find how long a man can remain in space, how he can adapt himself to weightlessness, how he can be returned safely into the gravitational field of the earth and take the stresses involved.

In order to develop the rendezvous technique, we shall be working with the Air Force to orbit an Atlas-Agena launch vehicle which will then be joined in orbit with the two-man spacecraft. The Agena will then become the engine for the spacecraft and will furnish power to maneuver it in space for many training and developmental manned flights. These two-man missions will go forward during the next few years. The project by its very nature will also be developing capability for military utilization, should that be required.

I should move on quickly to the area of advanced research and technology. As I have mentioned, among the most significant products returned from the national investment in this program, are assets such as our worldwide tracking and data acquisition network, our deep space network, our basic facilities through which the new generation of large launch vehicles and spacecraft can be manufactured in plants across the United States, brought together for fabrication outside New Orleans near the mouth of the Mississippi River, tested at a site near by in Mississippi, and then transported by water to Cape Canaveral and launched.

The capacity of the Nation for progress, represented by these assets, and the brain power and skills which will make it possible, will be required for a long time.

The next-to-last point I want to emphasize is that as we let large contracts to industry and place on the contracting firms the tasks, obligations, and responsibilities involved, we are proceeding prudently to try out and test such programs through the use of the smaller and less expensive Gemini. We are contracting in one-year increments so that we can speed up, slow down, or adjust the program as we learn from experiments as they go forward.

Finally, may I point out that from the beginning of the accelerated space program, the President emphasized that top officials of the Government must work together closely. He made it clear that he expected the Vice President and the Space Council to insist on this in every phase of the program. Thus, in the top echelons of Government, an effective organization and pattern has been worked out.

The men who are being recruited to hold executive positions in the space program -- whether promoted from within the governmental structure or brought in from industry or the universities -- are, in my opinion, as outstanding a group as I have ever worked with. Every American can be proud of the men contributing to the aeronautics and space program.

I would like to add that NASA relationships with the Department of Defense and the Military Services, with the Atomic Energy Commission and the Federal Communications Commission, beyond the areas of science and technology are also

close, productive, and significant. We are all learning to work together, not only on the how-to-do-it basis, but on problems of what is worthwhile doing and what kind of governmental policies should, for instance, be followed in regard to communications satellites and meteorological satellites.

The principle which the President enunciated and has insisted upon throughout is that the using agency must fund the program, be responsible for it, and utilize other agencies on something like a sub-contract basis.

In conclusion, may I repeat what John Glenn said before a Joint Meeting of Congress on February 26. "I feel we are on the brink of an area of expansion of knowledge about ourselves and our surroundings that is beyond description or comprehension at this time."

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